

# Needs Analysis for the Development of Flipchart-Based Learning Media with the Jigsaw Method to Improve Students' Concept Understanding of Vector Material in Class X SMA Bengkulu City

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## Abstract

The purpose of this study was to analyze the need for developing learning media in the form of flipchart media with the jigsaw method to improve students' understanding of concepts in class X vector material. The method used is quantitative descriptive method with data collection techniques through observation and interviews accompanied by documentation and literature review to review related research. From the results of the analysis carried out in physics learning, many learning media use print media. This is because the use of non-print media that has been used previously has several shortcomings when applied in offline learning but does not rule out the possibility of continuing to use it in offline learning. From the results of the data obtained, printed media in offline learning makes students better understand the material presented. This shows that there is a need for the development of more interesting learning media, for example illustrated learning media with flexible access that can be used in offline and online learning. Based on the results of the research that has been done, it shows that there is a need for appropriate media development in physics learning. One of the developments that can be done is to develop flipchart learning media using the jigsaw method.

## A. Introduction

Education is a determining factor in the success of a country. Behind a developed country is a well-managed education system, from the organization of learning in the classroom to the national education system that can certainly produce intellectual generations and be able to compete in the era of global technological advances. Based on a journal on the quality of education in Indonesia, it is stated that education in Indonesia is still relatively low. A factor in the low quality of education in Indonesia is the lack of math, science and reading skills. Other influencing factors are educational support facilities, the ability of teachers to explore the potential of students, the curriculum and the lack of teacher welfare (Lestari et al., 2022). In addition, it is also supported by research that suggests that the relevance of STS (Science, Technology and Society) education can equip young people to be socially responsible and contribute to the community environment during the Covid-19 pandemic. Therefore, it is necessary to conduct research related to this issue (Cleofas, 2021).

One of the scopes of science that is often considered difficult is physics. Research on student difficulties in physics subjects shows that students experience learning difficulties characterized by the percentage of difficulty understanding the material which reached 74.19%, the percentage of not being able to answer

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questions given by the teacher and the inability to understand sample problems of 87.1% and 83.87%, respectively (Ady & Warliani, 2022). This problem is an indicator of the need to integrate technology in classroom learning. Integrating technology in the classroom can shape more collaborative learning. Engagement, motivation and interaction in the classroom are key factors for successful learning (Rafiola et al., 2020). This is in line with the results of research that shows the identification of student difficulties in learning physics, especially vector material, which is done by giving questions, producing data on 39.1% of students who understand the concept of vectors. This is due to the lack of understanding of the basic concepts of vectors, especially in determining the direction of the vector so that students have difficulty in answering questions correctly (Sari et al., 2017).

With the development of technology in the 21st century, especially in the field of information and communication, education services are not immune from this influence. So that good preparation is needed in shaping superior human resources. Teachers are decisive in the success of education. Following up on these challenges, teachers need to develop themselves and learn new skills to adapt to the needs of students who are now always related to technology (Mulyanengsih & Wibowo, 2021). The use of technology in the form of digital media as an example of interactive video can increase understanding of knowledge, this is discussed in the article regarding the use of interactive and non-interactive videos from a psychological perspective relating to the cognitive development of students who are increasingly increasing if using interactive videos (Kirkorian, 2018).

One of the things that is also important to develop is learning media and teaching methods. These two things are very related, where learning media is a tool in learning and methods that guide the use of media (Mukarromah & Andriana, 2022). So that teachers can adjust the situation by developing learning media related to technology. This is reinforced by the post-Covid-19 situation which makes education management change from in-class learning to online or distance learning connected by technology. This is a challenge for future studies to focus on educational innovations related to the situation during the pandemic and after the pandemic (Mahajan et al., 2023).

The solution that can be done is the selection of the right media and methods in learning. Flipchart media is a collection of material summaries in the form of flipped paper. With the presentation in the form of attractive images and letters with contrasting colors so that it can attract students' attention (Yulianto et al., 2022). This is in line with the research conducted that the use of flipchart media with effective cooperative learning is shown by the N-Gain test with a percentage of 62% while learning with conventional media produces a percentage of 8%. With the results obtained, it shows that flipchart media is very effective in improving student abilities and learning outcomes (Aziz et al., 2020). Cooperative learning can also increase students' achievement in understanding the material provided in accordance with research using the murder CT cooperative learning model (Kusuma et al., 2019). Other research shows that an effective solution in overcoming low learning outcomes, creativity and motivation can be done by applying the right learning model, for example problem-based learning (PBL) (Wahyudi et al., 2023).

Then one of the methods that can be chosen is the jigsaw method, which is a cooperative learning technique that can be said to be group learning. It is characterized by the teacher forming groups of four or five students who will be given the same task in each group. After mastering their respective materials, the teacher will spread one by one students to other groups to share the material. This continues until all students understand all the tasks or materials given. This method allows students to work at school or at home by prioritizing the ability to learn with peers (Blajvaz et al., 2022). Of course in making media it is necessary to consider how to access it, it can be online or offline and can be both. This is related to research that has been conducted using interactive learning media in physics learning which shows that the media can improve student achievement and interest in learning (Liliana et al., 2020).

Many studies related to the use of flipcharts as learning media have been conducted in the field of science. Based on research conducted on grade 2 elementary school students in thematic subjects, it shows that with the use of flipchart media students understand the material better than using conventional media (Aziz et al., 2020). The same thing is also done by researchers who make flipchart media to provide knowledge about nutrition that is often ignored by students, so that after using flipcharts students can understand how correct and good nutritional knowledge is. Knowledge about nutrition is often considered a lot of practice and difficult to understand so that with the flipchart related understanding can be easier (Raikar et al., 2020). Students perceive flipcharts as facilitating learning and improving comprehension, supporting learning outcomes (Balante et al., 2023). Finally, the use of flipcharts in research conducted at SMA Negeri 24 Central Maluku shows that flipcharts can overcome the problem of decreasing cognitive learning outcomes in the midst of pandemic conditions that have occurred in recent years (Talakua & Aloatuan, 2021).

Based on the research that has been conducted, the majority uses flipcharts with cooperative learning models. Then, previous researchers also did not include the place of learning used. Here the researcher sees an opportunity to make research on flipchart media used in physics subjects in learning in the classroom and outside the classroom. According to research, learning outside the classroom can increase knowledge with direct instruction (Austen & Foran, 2020). In addition, researchers are also interested in making games in flipchart learning media that are suitable in combination with project-based jigsaw methods related to the material to be delivered. This is based on research conducted in the use of project-based learning methods on immune system material showing that with the problems given to students can hone problem-solving skills so that understanding of the material becomes deeper (Nurmaliah et al., 2021) and also based on research the use of games such as puzzles, mobile games, virtual games is very developed from the end of the 20th century which inspired researchers to make games in this flipchart learning media (Kittur & Islam, 2021). So it needs to be used in physics subjects because physics material is sometimes difficult to understand compared to other subjects.

Therefore, researchers want to develop flipchart media using the jigsaw method in learning outside and inside the classroom. So that it can create learning media that is interesting and easy to understand on the material of effort and energy. This research is entitled "Development of Flipchart-based Learning Media with the Jigsaw Method to Improve Students' Concept Understanding of Vector Material in Class XI SMA Bengkulu City".

## B. Research Methods

This research uses quantitative descriptive methods. Quantitative research method is a systematic research method on the parts and phenomena and relationships contained therein. In quantitative research the research results produce data in the form of numbers (Hardani et al., 2020). While descriptive research methods are methods in researching the status of human groups, an object, a condition, a thought, or current events. The use of these methods is to create a systematic, factual and accurate description or description of existing phenomena (Jayusman & Shavab, 2020). So that if we combine the two methods, it is a method that describes variables that really occur supported by data in the form of numbers based on actual circumstances. This research uses data collection techniques through observation and interviews accompanied by documentation. In addition, researchers also conducted literature reviews that examined related research.

The research samples were taken from SMA N 9, SMA N 1, and SMA N 3 Bengkulu City. The type of sampling is done by simple random sampling with the population taken is students and physics teachers in each school. The measurement scale uses a Likert scale with quantitative and descriptive data analysis techniques. The research was conducted at the beginning of the odd semester of the 2023/2024 academic year.

In this research, there are several stages carried out, the first of which is determining the person, place and what will be observed in the research or commonly called the research subject. The subject that has been chosen will be the target in the research. The subjects in this study were physics teachers and students of SMA N 9, SMA N 1, and SMA N 3 Bengkulu City. Then the researchers conducted data collection with two techniques, namely, literature study and field study. Literature study was conducted by collecting library data, reading, recording and managing research materials related to the problem and research objectives where this research is related to flipchart learning media and jigsaw method in improving students' concept understanding in physics learning. After that, a field study was conducted by conducting in-depth interviews in the form of open and direct questions and answers to respondents who became research samples. The questions and answers are related to physics learning with all aspects that support the continuity of learning. In addition to interviews, researchers also made observations related to student and teacher schools in schools selected as research samples. After all stages were carried out, the last researcher conducted a needs analysis based on the data in the previous stages. Data regarding physics learning, the use of learning media, learning facilities and much more.

Data collection is done to complete and support the accuracy of information in the learning media development process. The data taken is done in several ways, namely literature studies and field studies in the form of interviews and observations. Research instruments are materials used for data collection. The instruments used are observation sheets, interview sheets equipped with documentation.

Research related to the development of flipchart learning media at SMA Negeri 1, SMA Negeri 3 and SMA Negeri 9 Bengkulu City. The limitations of the research when the interview was quite crowded so it tended to be noisy. In this case the researcher overcame it by taking notes and recording the interview process.

Then some students' statements were not the same and seemed less honest. So that researchers cross-check answers with other answers, and observation.

### C. Result and Discussion

Based on the results of interviews conducted, it shows that there is still a lack of use of school facilities, such as physics laboratories, wifi, and other facilities, learning is dominantly carried out in class with printed media. For the use of the internet, the majority of students and teachers use a separate network, due to the limited wifi network. So that the use of electronic media has not been utilized too much. Some schools have utilized the physics laboratory well, but the use is still small. This is due to several things, one of which is not good management while practicum equipment is fully available provided by the school.

From the results of the interview, the physics learning process uses various types of learning media, such as projectors, ppt, animated videos and many more. However, the dominating learning media is using print media. This is because with print media children can see directly and read related material given. In between the use of print media teachers also use non-print media to convey material. So for its use, both are equally good and can be used to convey material. The methods most used by teachers in the learning process are discussion, lecture and project methods. This is not without reason because learning physics which is considered quite difficult makes students need the right method tailored to the material to be delivered. Based on interviews, many students prefer the lecture method for difficult physics material, this is so that students understand well. In addition, from the results of interviews students prefer learning in the morning with 2 meetings, because students are still fresh and excited.

The research conducted shows that the development of learning media needs to be done in physics subjects. This is because difficult material makes it difficult for students to understand the material presented. For material that is considered difficult by students, there are different opinions, but what is considered difficult is understanding the concept of using formulas and analyzing theories. From the data obtained, both teachers and students are interested in pictorial and electronic learning media. One of the media that can be developed is flipchart learning media. As in the research entitled "Improving Student Achievement Using Flipchart Based Cooperative Learning in Tulungagung" on elementary school students shows that with the use of flipchart learning media students understand the material better than using conventional media (Aziz et al., 2020).

From the results obtained that the use of flipchart learning media is effectively used in science subjects. With an attractive, illustrated and colorful display, students become more interested in reading and understanding the material in the learning process. The research shows that with flipchart learning media students understand the material more easily. So that flipchart media can be an alternative in increasing understanding related to the material presented.

This research was only conducted in a few schools with limited respondents and time. With a small number of respondents, the results of the interview were not comprehensive to all students in Bengkulu City High School. Suggestions for the future can be done more broadly by involving more student opinions related to physics learning.

### D. Conclusion

Based on the results of research conducted at SMAN 1 Bengkulu City, SMAN 3 Bengkulu City, and SMAN 9 Bengkulu City, it shows that there is a need for appropriate media development in physics learning. One of the developments that can be done by developing flipchart learning media using the jigsaw method.

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